IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

DEEPA RAMASWAMY ET AL.

Group Art Unit: 3661

Examiner: Christine M. Behncke

Serial No.: 10/064,894

Filed: August 27, 2002

For: VEHICLE SYSTEM CONTROLLER WITH MODULAR ARCHITECTURE

Attorney Docket No.: 200-1576 / FMC 1649 PUS

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Mail Stop Appeal Brief - Patents
Commissioner for Patents
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Appeal Brief from the final rejection of claims 19-39 of the Final Office Action mailed on December 13, 2006 for the above-identified patent application.

I. REAL PARTY IN INTEREST

The real party in interest is Ford Motor Company ("Assignee"), a corporation organized and existing under the laws of the state of Delaware, and having a place of business at Suite 600 - Parklane Towers East, One Parklane Boulevard, Dearborn, Michigan as set forth in the assignment recorded in the U.S. Patent and Trademark Office on August 27, 2002 at Reel 013025/Frame 0922.

II. RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences known to the Appellants, the Appellants' legal representative, or the Assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-18 were previously canceled and claims 19-39 are currently pending. Claims 19-39 have been rejected and are the subject of this appeal.

IV. STATUS OF AMENDMENTS

No after final amendments have been filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates to a vehicle system controller having a modular architecture which is logically partitioned based upon vehicle functionality. The partitioning of the present invention allows for relatively quick and easy modification or replacement of the vehicle control processes or features. (¶ 2)

Referring to Figure 2, there is illustrated a vehicle system controller 40 which is employed within a vehicle 10. The vehicle system controller 40 may be electrically and communicatively coupled to conventional user or driver operating controls or components 42, to one or more conventional vehicle operating condition sensors 44, and to subsystem controllers 46-52 by way of a conventional bus or electric signal routing assembly. The controller 40 may receive signals and/or commands generated by driver inputs, vehicle operating condition sensors, and subsystem controllers and processes and utilizes the received signals to determine the amount of torque which is to be provided to the vehicle's drive train 28 and to generate commands to the appropriate subsystems or controllers 46-52 to selectively

provide the desired torque to the drive train 28 to provide the requisite functionality to vehicle 10. (¶ 21)

The vehicle system controller 40 is modular and is composed of a number of different control portions 56-70 which correspond to certain vehicle functions or features. Each control portion may represent a removable hardware and/or software segment, portion or device of the vehicle system controller which is electrically and/or communicatively interconnected with other portions of the vehicle system controller 40. The partitioning of vehicle features within the vehicle system controller provides a logical grouping of functions. (¶ 26) This unique arrangement allows for the vehicle components and processes to be easily switched or replaced, without requiring reprogramming or replacement of the entire controller. This allows modifications to vehicle 10 to perform relatively quickly, and also allows the vehicle system controller 40 to be used on various types of vehicles with portions 56-70 being selected and/or adjusted based upon the particular vehicle's functionality. (¶ 36)

Independent claim 19 relates to a vehicle system controller for a vehicle. The controller includes a vehicle mode control portion 56, and output torque requestor control portion 58, a battery management control portion 60, a driver information control portion 62, and energy management control portion 64, a brake system control portion 66, and engine start/stop control portion 68, and a torque estimation control portion 70. (Fig. 2, ¶ 26-27.)

Independent claim 39 relates to a vehicle system controller for a vehicle. The controller includes a vehicle mode control portion 56, and output torque requestor control portion 58, a battery management control portion 60, a driver information control portion 62, and energy management control portion 64, a brake system control portion 66, and engine start/stop control portion 68, and a torque estimation control portion 70. The vehicle system controller is configured such that each control portion may be removed from the controller without disrupting operations of the other control portions. (Fig. 2, ¶ 26-27.)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 38 and 39 are properly rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.

2. Whether claims 38 and 39 are properly rejected under 35 U.S.C. § 103(a) as being unpatentable over USPN 6,649,026 to Horsley (hereinafter "the Horsley patent") in view of USPN 6,236,909 to Colson (hereinafter "the Colson patent").

Please note claims 19-37 stand rejected in the Final Office Action. The Appellants have elected not to review the rejection of these claims on appeal.

VII. ARGUMENT

A. Claims 38 and 39 are improperly rejected under 35 U.S.C. § 112, first paragraph.

Claims 38 and 39 include limitations directed towards a vehicle system controller for a vehicle having a number of control portions which are removed from the controller without disrupting operations of the other control portions. The Examiner submits the Specification fails to convey to one having ordinary skill in the art that the inventors, at the time of filing the application, were in possession of the subject matter associated with the noted claim limitations. The Appellants respectfully disagrees with the Examiner's position and assert that the application does properly support these claim limitations.

Paragraph 2 of the application states:

> . . . a vehicle systems controller . . . having a modular architecture . . . which is logically partitioned . . . for relatively quick and easy modification or replacement of vehicle control processes or features.

Paragraph 26 of the application states:

> . . . Each portion may represent a removable hardware and/or software segment, portion or device of the VSC 40 . . . The architecture of VSC 40 also enables relatively easy **replacement of one type of functionality for another** (e.g., series versus parallel regenerative braking). Particularly, a certain vehicle functionality may be replaced by removing (e.g., disconnecting or deleting) a certain portion of controller 40 and installing (e.g., connecting or loading) a replacement portion which provides the desired functionality.

Paragraph 36 of the application states:

> . . . Each portion 56-70 of the VSC 40 performs a unique vehicle function as set forth above. This unique arrangement allows for the vehicle components and processes to be easily switched or **replaced, without requiring reprogramming** or replacement of the entire controller. This allows modifications to vehicle 10 to be performed relatively quickly, and also allows this VSC 40 to be used on various types of vehicles with portions 56-70 being selected and/or adjusted based upon the particular vehicle's functionality.

The Appellants submit the foregoing portions of the application support the claim limitations directed towards support that the controller being configured such that each control portion may be removed from the controller without disrupting operations of the other control portions. As noted above, the controller is partitioned so that one control portion facilitate replacement of one type of functionality for another. Replacing control portions having one type of functionality with another type of functionality dictates that the non-replaced or remaining control portions must continue to operate without disruption.

The control portions could not be replaceable with another type of functionality if such replacement disrupted the operation of the control portions. Consequently, the Appellants respectfully submits that the specification, which states that the control portions may be replaced with different functionality, supports the Appellants' argument that they were

in possession of the claimed invention at the time of filing and that claims 38 and 39 are improperly rejected under 35 U.S.C. § 112, first paragraph.

B. Claims 38 and 39 are patentable under 35 U.S.C. § 103(a) over the Horsley and Colson patents.

Claims 38 and 39 include limitations directed towards a vehicle system controller for a vehicle having a number of control portions which are removed from the controller without disrupting operations of the other control portions. The Examiner submits the combination of the Horsley and Colson patents disclose these limitations. The Appellants submit that the cited references fail to teach the noted limitations.

The Examiner admits the failure of the Horsley patent to teach that the control portions are removed from the controller without disrupting operations of the other control portions and instead the Examiner relies on the Colson patent. The Colson patent, however, fails to make up for the deficiencies of the Horsley patent as the Colson patent similarly fails to teach that the control portions are removed from the controller without disrupting operations of the other control portions.

The Examiner submits the following portion of the Colson patent teaches the noted claimed limitations:

> More recently, computing architectures have incorporated a component approach. In these computing architectures, the base platform is composed by lower level components in an architecturally consistent fashion. This approach yields a more modular approach to software platforms, **which allow any component to be replaced by another component, which achieves the same task**. What allows this exchangeability of components is the standardization of software interfaces. A component is built to support one or more interfaces and provides these services to the computing platform. Any other

> component, which also implements those interfaces, can be used as a replacement. (column 1, lines 16-27, emphasis added)

The Colson patent discloses a modular approach where components may be replaced with other components that achieve the "same" task. The replacement of the components with the same task fails to teach that the components may be replaced without disrupting operations of the other components. It implies that the components must be replaced with the same functionality or else the operation of the other components will be disrupted. This is inapposite to the claimed invention which enables the control portions to be removed and replaced with different functionality and without disrupting operation fo the other control portions.

Because the Colson patent requires components to be replaced with components providing the "same" task, the components are not removable without disrupting operation of the other components, otherwise the components could be replaced with "different" tasks. Consequently, the Colson patent fails to make up for the deficiencies of the Horsley patent and the combination thereof fails to teach the invention recited in claims 38 and 30.

CONCLUSION

In view of the foregoing, Appellants respectfully submit that the rejections are desired to be reviewed on appeal have been fully replied to and traversed. The Board is respectfully requested to consider these traversals and to pass the case to issue.

No fees are believed to be necessary. If, however, any fees are required the Commissioner is hereby authorized to charge any fees or credit any overpayments to Ford Global Technologies LLC Deposit Account No. 06-1510.

Respectfully submitted,
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Enclosure - Appendices

VIII. CLAIMS APPENDIX

19. A vehicle system controller for a vehicle comprising:

a vehicle mode control portion;

an output torque requestor control portion;

a battery management control portion;

a driver information control portion;

an energy management control portion;

a brake system control portion;

an engine start/stop control portion; and

a torque estimation control portion.

20. The controller of claim 19 wherein the vehicle mode control portion determines an operating mode for the vehicle and communicates the operating mode of the vehicle to the other control portions so that the other control portions may function according to the current vehicle mode.

21. The controller of claim 19 wherein the vehicle mode control portion determines faults prior to starting and stopping the vehicle and during vehicle operation in order to insure the other control portions respond to the fault before proceeding.

22. The controller of claim 21 wherein the vehicle mode control portion selects a limited operating strategy ("LOS") mode with which to operate the remaining functional powertrain components or shuts down the vehicle when the fault is detected.

23. The controller of claim 19 wherein the output torque requestor control portion receives and handles all torque commands from requesting devices within the vehicle and determines a final wheel torque (positive or negative) that powertrain and regenerative braking systems must produce.

24. The controller of claim 23 wherein the output torque requestor control portion combines driver demands from accelerator and brake pedals and arbitrates requests from cruise control, traction control, interactive vehicle dynamics, and vehicle speed limiting systems when determining the final wheel torque.

25. The controller of claim 23 wherein the output torque requestor control portion divides the final wheel torque between vehicle powertrain and brake assemblies and issues corresponding commands to an engine controller control, transaxle controller and brake controller.

26. The controller of claim 21 wherein the battery management control portion interfaces with a battery controller and controls opening and closing of contactors in a battery pack based upon the vehicle mode signals received from portion.

27. The controller of claim 21 wherein the battery management control portion reads and processes discharge/charge power limits from a battery controller and monitors a battery for faults and communicates this information to the other control portions.

28. The controller of claim 19 wherein the driver information control portion receives signals from vehicle sensors and controllers and calculates vehicle operating data that is conveyed to the driver.

29. The controller of claim 28 wherein the driver information control portion receives measured data associated with vehicle speed, battery state of charge, and available battery power and uses algorithms to communicates signals representing this data to the instrument panel or other vehicle displays or data providing devices.

30. The controller of claim 19 wherein the energy management control portion controls power flow between and engine, motor, generator, battery, and wheels.

31. The controller of claim 19 wherein the brake system control portion implements regenerative braking control process of the vehicle as a function of whether regenerative braking is for series regenerative braking or for parallel regenerative braking.

32. The controller of claim 31 wherein the brake system control portion control an engine, output shaft, planetary gear set, and drive train to utilize engine compression braking when regenerative braking is not available.

33. The controller of claim 19 wherein the engine start/stop control portion coordinates timing and operation of the "startup" and "shutdown" of an engine of the vehicle.

34. The controller of claim 19 wherein the engine start/stop control portion contains logical conditions used to decide whether to turn on/off the engine or, if already "on", whether to keep the engine "running".

35. The controller of claim 19 wherein the engine start/stop control portion coordinates a process of engine startup among an engine controller and transaxle controller in order to minimize undesirable noise, vibrations, "harshness", and emissions.

36. The controller of claim 19 wherein the torque estimation control portion estimates torque produced by an engine and transaxle.

37. The controller of claim 36 wherein the torque estimation control portion receives torque estimates from an engine controller and transaxle controller and compares the engine controller estimate to the transaxle controller estimate such that if the estimates vary beyond a certain threshold value, the torque estimation control portion notifies portion the vehicle mode control portion of a potential fault condition.

38. The controller of claim 19 wherein each control portion may be removed from the controller without disrupting operations of the other control portions.

39. A vehicle system controller for a vehicle comprising:

a vehicle mode control portion;

an output torque requestor control portion;

a battery management control portion;

a driver information control portion;

an energy management control portion;

a brake system control portion;

an engine start/stop control portion;

a torque estimation control portion; and

wherein each control portion may be removed from the controller without disrupting operations of the other control portions.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.